Version: 1.80.0001

KCG3 SMART BATTERY CHARGER

USER MANUAL

KCG3-250A/36V-3

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1. Introduction

The KCG3 smart battery charger is a high frequency switching mode charger with IGBT and PWM controller. Designed with soft switching (zero voltage switching and zero current switching) technology, the highly efficient KCG3 ensures the maximum power for use yet very low electromagnetic interference. Moreover, the KCG3 can support various charge curves, provide all all-around protections and prolong the battery life. Friendly user interface, LCD display, and key input make it easy to use.

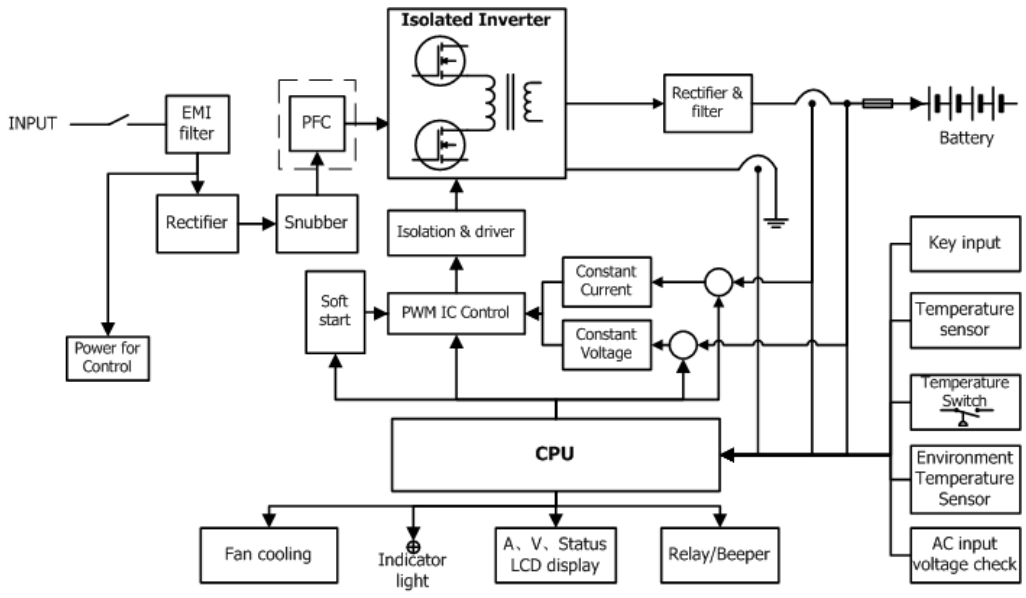

Figure 1. Block diagram of KCG3

Thus, it can be widely used to charge any kind of batteries in different areas such as marine vessel, railway vehicle, electric-vehicle, e-forklift, and solar power station, etc.

2. Technique Specifications

(1) Power supply: 3-phase, 220(support 208 and 240)VAC, 50/60Hz.

(2) Outputs:

12VDC-48.6VDC, 250A.

(3) User interface:

LCD display and key input

voltage display precision: 0.1V; amps display precision: 1A

(4) Set charging parameter precision:
voltage: 0.1V; current: 1A

(5) Charge curve:

(5-1) 3-stage charge

A: limited current / Boost, B: Constant Voltage, C: floating

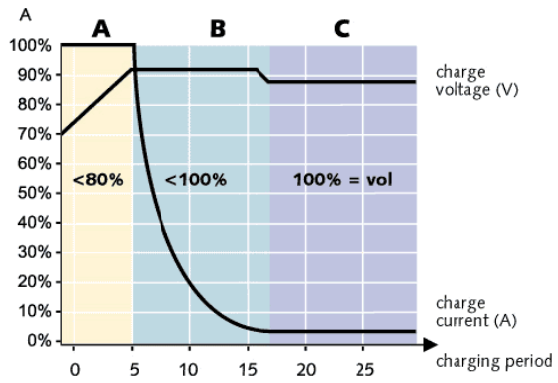

Figure 2. 3-stage recharge voltage/current curve.

(5-2) 4-stage charge

A: Constant current 1, **B**: Constant Voltage 1, **C**: C.C. 2, **D**: C. V. 2

Figure 3. 4-stage recharge voltage/current curve.

(6) Protection and Alarm:

Over voltage protection, Over load protection,

Input voltage low/high protection,

Input fuse/air breaker protection.

Battery reverse connection protection with output fuse.

Output power limitation,

Temperature control fan cooling (about 45°C)

Reduce output power (about 75°C -78°C), resume (about 65°C)

Over temperature protection (about 80°C -85°C) (stop and auto restart)

Password for parameter setting.

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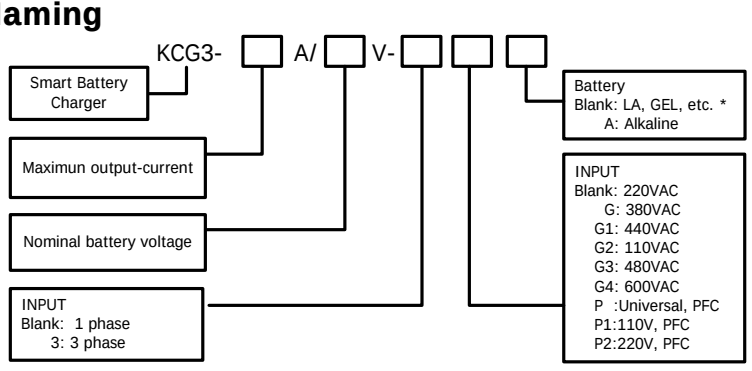
(7) Low ripple, 0.5% of the charge voltage
(8) Passive PFC for 3-phase input, cosΦ >0.93.
(9) Battery temperature compensation.
(10) Real time clock and Daily start time. With a CR2302 Li-ion battery.
(11) Charge efficiency: >92%
(12) Operating temperature range: 0~50°C (32~122°F)

3. Naming



4. Installation and Operations:

(1) The battery charger **must not** be installed in the vicinity of heat sources or exposed to water.
(2) Ventilation slots **must not** be obstructed and ensure adequate ventilation
(3) The battery should be connected correctly. Be careful and **do not** reverse the poles “+” and “-”.
(4) The temperature compensation sensor should be installed next to or near the battery.
(5) **The input wires and the GND should be connected correctly**. Turn on the input air breaker; the LCD back-light will be on.
(6) Keys for control.
(7.1) There are 5 keys on the front panel which are “Menu/Set”, “Up”, “Down”, “Back/Cancel”, and “Start/Stop”.
(7.2) Press “Menu/Set” to enter the menu. Then
Press “Up”, “Down” to choose item; or
Press “Back/Cancel” to return to previous menu.

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(7.3) Choose an item, press “Menu/Set”, the value will flash. Then
Press “Up”, “Down” to increase or decrease the value. Then
Press “Menu/Set” to save the new value; or
Press “Back/Cancel” back to return to previous menu without save.
Press and hold “Up” or “Down” will speed up the value changing.

(7.4) Press “Start/Stop” to start or stop the charging manually.

(7.5) press any key, the beeper will beep once.

(7) If the “Password” function is enabled, a password is required before enter the menu. If the password is accepted, the user can modify all the values; otherwise, the user can modify the clock and start time only, that is to say, other values can be viewed but cannot be modified.

(8) Set parameters.

1. “**Start time**”. Set the daily auto charge time. It can be enabled or disabled.
2. “**Floating volt**”. Set the floating charge voltage.
3. “**Constant curr**”. Set the constant current.
4. “**Equalize volt**”. Set the equalize charge voltage.
5. “**Curr to Float**”. Set a current value, the floating charge will begin when the current reaches this value.
6. “**Delay time**”. Set the floating charge time.
7. “**Volt. Protect**”. Set the over voltage protection value
8. “**Equalize Days**”. If “Delay time” is set to “NO STOP”, floating charge will last 7-30 days, then the charger will restart to equalizing charge. This is a “3-stage curve” parameter only.
9. “**Battery Type**”.
   With 3-stage curve, “LA/VRLA/AGM” and “GEL”
   With 4-stage curve, “Flooded LA”, “GEN GEL LA”, “AGM SEALED LA”, and “TUBULAR LA”. Changing battery type will change the charge voltages and currents automatically.
10. “**T. compenst**”. Set the environment temperature compensation voltage value.
11. “**Charge curve**”. Choose 3-stage or 4-stage charge curve.
12. “**Battery volt**”. Choose battery voltage from 12V, 24V or 36V. The charge voltages will change automatically.
13. “**Ah rating**”. Setting the battery capacity will change the charge current values. This is a “4-stage curve” parameter only.

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14. “**Set default**”. Set parameters to the factory default values. This item will not be displayed if the password is invalid.
15. “**Set password**”. Change the password. This item will not be displayed if the password is invalid.
16. “**Set clock**”. Set the real time clock.

Parameters can only be set when the charger is in “Stop Charge” status.

(9) LCD will display output voltage & current on the first line, the status of charger on the second line, the charging time on the third line and the real time clock & environment temperature on the fourth line.

Status	Display	Indicator	Actions	
Constant current	Equalize charge	Yellow flash		3-stage
Constant voltage	Constant Volt	Yellow light		
Floating charge	Floating charge	Green flash		
Constant current 1	C. C. 1	Yellow flash		4-stage
Constant voltage 1	C. V. 1	Yellow light		
Constant current 2	C. C. 2	Yellow light		
Constant voltage 2	C. V. 2	Yellow light		
Charge complete.	Completed!	Green flash	stop charge	
temperature protection (75°C)			Reduce the output power	
Over volt protection	Over voltage	Red flash	stop charge	Manually restart
Over Load protection	Over load	Red flash	stop charge	Auto restart. (If the charger restarts 3 times in 1 minute, the user should restart it manually.)
Over temperature protection (80°C -85°C)	Over heating			
low/high AC input voltage protection	Input abnormal			
Extremely high AC input voltage protection	Input abnormal	Red flash	stop charge Beeper beeps.	Cut off input immediately and check the input voltage.
Stop charge	Stop charge	Green light		

Table 1. Charger status

(10) Stop and alarm

• The charger will stop due to output **over voltage**. The indicator will red and flash. The user should restart the charge manually.

• The charger will stop due to **over load,** or **over temperature,** or **AC input voltage abnormal**. The indicator will turn red and flash. When the charger resumes, it will restart automatically. But if it protects 4 times in 1 minute, it will restart once every hour. In this condition, the user can restart the charge manually.

• Press “Menu/Set” key to acknowledge the alarm and then press “Back/Cancel” key to restart manually.

• When charge is **completed**, the charger will stop. The indicator will turn green and flash.

(11) Extremely high input voltage protection. When the input voltage is higher than 275VAC, the charger will stop and the beeper will beep in each second. The input should be **cut off immediately**.

(12) Please check your battery document to get more information about how to set the charge parameters to charge the battery properly.

(13) **DC active**: Connect the battery and the charger will start to charge.

(14) **Auto-stop**: Disconnect the battery. When the current is less than 2 Amps, the charger will stop charging and show “Completed!”.

Note: The “DC active” is disabled during the charging. And it can be enabled again when the voltage of the output terminals falls below half of the battery nominal voltage. That is to say, the user should wait a few seconds after disconnect the charged battery and then connect another empty battery.

For example, when a 24V battery is disconnected from the charger, the voltage of the output terminals will decrease. After a few seconds, it falls to 12.0V, which is half of the battery nominal voltage 24V. The “DC active” will be enabled at this moment. Then the user can connect another 24V battery to the charger and the charger will start to work automatically.

(15) Charging time will not be cleared until a new charging starts.

(16) Replace the CR2302 battery for real time clock. Open the front door and remove the cover behind the LCD. CR2302 is located on the PCB. The life of a new CR2302 is about 15000 hours if AC power is cut off.

Note: Specifications is subject to change without notice.